

Appl. No. 10/623,264
Amdt. Dated December 28, 2006
Reply to Final Office Action of July 28, 2006

Attorney Docket No. 81842.0016
Customer No. 26021

Remarks:

This Response is filed with a request for continued prosecution. Claims 1-12 are pending in this application. Applicant submits that the currently outstanding final rejection appears to be based on a misunderstanding of the cited prior art references. No reference cited against the application describes or suggests testing an electrical or WSR channel between an optical drive controller and a laser diode driver. Applicant respectfully requests reconsideration, withdrawal of the outstanding rejections and allowance of the application.

The Official Notice with Respect to Claims 8-12 Should be Withdrawn:

The final Office Action dated July 28, 2006 rejected claims 8-12 as unpatentable over U.S. Patent No. 6,944,109 to Wang, et al., taken in view of U.S. Patent No. 6,930,968 to Kamioka, et al., and further taken in view of alleged “well known ...use” and Official Notice. Applicant filed an after-final Response on September 25, 2006 that requested identification of a reference to support the assertion of “well known ... use” and Official Notice.

An Advisory Action dated October 30, 2006 identified U.S. Patent No. 4,638,429 to Watabe, et al., as describing a WSR register and corresponding to the earlier assertion of “well known ... use” and Official Notice.

Applicant respectfully disagrees with the Advisory Action’s assertion that the Watabe patent supports the final Office Action’s assertion of well known use and Official Notice. The Watabe patent describes a “WSR register” 10 used internally within a pipelined microprocessor to store the results of an arithmetic logic unit 8. Such an “WSR register” 10 that stores ALU results as described in the Watabe patent is wholly unrelated to the “WSR channel” recited in claims 8-12 of the present application. Claims 8-12 require in pertinent part that the WSR channel be between an optical drive controller and a laser diode driver and that timing signals

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and monitor signals be output over the WSR channel. Nothing about the WSR register 10 of the Watabe patent could be used between an optical drive controller and a laser diode driver of an optical disk drive and the WSR register could not pass the recited timing or monitor signals in a usable form. Consequently the Official Notice is improper and should be withdrawn. In the absence of this Official Notice, applicant respectfully submits that claims 8-12 should be allowed.

Summary: Neither Wang Nor Kamioka Teach Testing an Electrical Channel Between an Optical Drive Controller and a Laser Diode Driver

The final Office Action dated July 28, 2006 rejected claims 1-12 as unpatentable over U.S. Patent No. 6,944,109 to Wang, et al., taken in view of U.S. Patent No. 6,930,968 to Kamioka, et al., and for claims 8-12 further in view of alleged “well known ...use” and Official Notice. Claims 1-12 clearly distinguish over the proposed combinations of references because the claims recite testing timing characteristics of an electrical or WSR channel between an optical drive controller and a laser diode driver and neither of the cited references tests any timing characteristics of such a channel. Moreover, no cited reference describes or suggests “generating a set of calibration signals to program a drive characteristic associated with a laser diode driver,” as required by claims 1-7. None of the references describe the “laser diode driver providing the monitor signal over the WSR channel to the optical drive controller,” as recited in claims 8-12.

The final Office Action agreed that the Wang patent does not teach testing the timing characteristics of an electrical channel between an optical drive controller and a laser diode driver. The Advisory Action is consistent and cites only the Kamioka patent as teaching “testing the timing of the laser driving signal,” with reference to FIG. 3 and to column 16, lines 47-53 of the Kamioka patent. Contrary to the position of the Advisory Action, the Kamioka patent teaches nothing about

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testing an electrical channel between a controller and a laser diode driver. The cited section (column 16, lines 47-53) of the Kamioka patent describes a signal S that controls a switch 516 to add a high frequency signal to a laser modulation signal within the laser driver shown in FIG. 3. Signal S is a control signal generated by the switching timing control section 65 (FIG. 1). As shown in FIG. 6, signal S is purely a square wave control signal and performs no testing functions at all. See Kamioka patent at column 14, lines 41-44.

If instead of suggesting that the signal S tests the electrical channel, the Office Action takes the position that the signal S is the calibration signal, there is nothing in the Kamioka patent that suggests that S is ever adjusted in response to testing but is instead regularly generated from the B signal generated within the laser timing control section 61 of the control block 7A. This is shown in FIG. 6 and is unambiguously stated at column 16, lines 11-15 of the Kamioka patent. Consequently, the signal S cannot be a test signal and cannot be a calibration signal as those terms are used in claims 1-7. There is no suggestion whatsoever that the signal S could be the monitor signal transmitted from the laser diode driver to the optical drive controller as those terms are used in claims 8-12.

The Advisory action also seeks to support the rejection by referring to signal J shown in FIGS. 1 and 15 of the Kamioka patent. Signal J is a control signal used in the system of the Kamioka patent by the central processing block 6A to control the operation of the reproduction signal processing block 5A. Reproduction signal processing block 5A is, with the processing block 6A, within the controller 7A (see FIG. 1) and “reproduction signal processing block 5A” reproduces signals detected by the optical pickup 2A. Kamioka patent at column 12, lines 47-49. Consequently, block 5A is not involved in writing data and so cannot provide “calibration signals” to “program a drive characteristic of associated with a laser diode driver,” as required by claim 1 of this application. Moreover, signal J cannot be the electrical

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channel referenced in the claims because it is entirely internal to the optical drive controller and does not connect to the laser diode driver 22, 122 of the Kamioka patent's system. Similarly, signal J cannot be the monitor signal recited in claim 8 because it is not transmitted from the laser diode driver to the optical drive controller.

Because the cited references do not describe or suggest the claimed subject matter, applicant respectfully requests that the outstanding rejection of the claims be withdrawn and the application allowed.

Discussion

Jitter, skew and other timing errors and variations in the channel between a controller and a laser diode driver can cause write errors and cannot conventionally be detected in optical disk drives. Application at ¶¶ 15, 22-24. The systems described in the application can address these problems by testing the WSR channel between the controller and the laser diode driver and adjusting the laser diode driver's pulse generation according to the delays and variations detected in the channel. The present application specifies that a preferred optical drive controller tests the timing characteristics of a WSR channel between the controller and the laser diode driver and adjusts timing characteristics to correct for detected timing variations. These aspects of the application's system are described, for example, in paragraphs 16-17 and 25-31.

The primary reference, the Wang patent, is directed to a system for adjusting the power output of a laser diode and does not test the timing characteristics of a channel between a laser diode driver and an optical drive controller. Because the Wang patent is directed to a laser diode power monitoring and control system, it does not adjust the timing of the laser diode drive signals according to channel delay characteristics. As noted in the final Office Action, the Wang patent does not

teach testing the timing characteristics of an electrical channel between an optical drive controller and a laser diode driver. Final Office Action at 2. Contrary to the final Office Action, however, the secondary reference, the Kamioka patent, does not teach anything about testing the timing characteristics of an electrical channel and does not teach anything about calibration signals. Rather, the Kamioka patent teaches the selective use of a filter to either save power or to maintain better signal fidelity.

The Kamioka patent describes an optical disk controller for generating PWM signals and addressing certain problems with the implementation of PWM signals in optical disk drives. In one aspect, the Kamioka patent teaches adding a 300 MHz modulation signal to the primary modulation signal to prevent mode hopping in the laser, which thereby reduces noise from the laser. Kamioka patent, col. 14, lines 1-14. In another aspect, filter 515 is implemented with a switch 520 to selectively incorporate the filter 515 in the circuit to reduce power consumption and to take the filter 515 out of the circuit to improve signal fidelity during an initial part of the write process. Kamioka patent, col. 14, lines 23-63; FIG. 6. There is, on the other hand, nothing in the Kamioka patent about testing the timing characteristics of an electrical channel between the optical drive controller and the laser diode driver.

The Kamioka patent does describe an optical drive controller 7A, shown in FIG. 1, and a laser diode driver 122, indicated in FIG. 1 and shown in greater detail in FIGS. 2 and 3. The electrical communication channels between the optical drive controller 7A and the laser diode driver 122 are identified by the designations A, B, C, D, E, O, P, Q and R in FIGS. 2 and 3. The functions of these signals are discussed at column 13, lines 45-60, and column 15, lines 14-20 and 50-63. Nothing in these discussions indicates that these electrical channels are ever tested or that any propagation characteristic of these electrical channels is used in generating a calibration signal. Nothing in these discussions of the electrical channels provides

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any discussion of a monitor signal transmitted from the laser diode driver to the optical drive controller over these electrical channels as those terms are used in claims 8-12.

Both the final Office Action and the Advisory Action referenced column 16, lines 47-53 to support the allegation that the Kamioka patent describes testing a timing characteristic. There is no basis for this assertion. The cited passage describes the operation of switching section 520 to selectively incorporate the filter 515 in the circuit. This is illustrated in part in FIG. 3, which shows that the signal S controls the switching section 520. No testing is done to determine the characteristics of the electrical channel.

FIG. 6 provides further illustration of the signal S, which shows that the signal S is regularly switched high to optimize the circuit characteristics for the initial part of the write process. That is, the signal S is coordinated with data writing only and is generated in response to signals related to the write process. Because S is derived solely from the write signals, the signal S is not responsive to any timing measurements. As stated at column 16, lines 11-15 of the Kamioka patent and shown in FIG. 6, the signal S is regularly generated based on the B signal generated within the laser timing control section 61 of the control block 7A. As is conventional in the art, the B signal is a rectangular wave signal generated for each pulse of a PWM modulation pattern, also shown in FIG. 6. This is shown in FIG. 6 and is unambiguously stated at column 16, lines 11-15 of the Kamioka patent. Because of this, the S signal is neither a test signal nor is it a calibration signal responsive to a test signal.

Consequently, the cited passage does not state and does not suggest that the Kamioka patent describes testing the timing characteristics of the channel or generating any set of calibration signals responsive to the timing characteristics determined by testing.

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Neither the Wang patent nor the Kamioka patent describe testing an electrical channel between an optical disk controller and a laser diode driver and neither teaches or suggests the presently claimed inventions.

Moreover, neither the final Office Action nor the Advisory Action identified anything that generates “calibration signals responsive to the timing characteristics test by the optical drive controller” as required by claims 1-7. Neither the final Office Action nor the Advisory Action identified any signal generated by the laser diode drive that corresponds to the monitor signal recited by claims 8-12.

Claim 1 distinguishes over the Wang patent in combination with the Kamioka patent by reciting “the optical drive controller testing timing characteristics of an electrical channel between the optical drive controller and a laser diode driver and ... generating a set of calibration signals ... responsive to the timing characteristics tested by the optical drive controller.” Neither the Wang patent nor the Kamioka patent describe testing the timing characteristics of the channel or generating any set of calibration signals responsive to the timing characteristics determined by testing. Consequently, claim 1 and its dependent claims 2-7 distinguish over the Wang patent in combination with the Kamioka patent and the other art of record and are in condition for allowance.

Claim 8 distinguishes over the Wang patent in combination with the Kamioka patent by specifying “a WSR channel coupling the optical drive controller to the laser diode driver.” Claim 8 further distinguishes over the Wang patent by reciting “the optical drive controller outputting timing test signals over the WSR channel, the laser diode driver ... responsively generating a monitor signal responsive to timing characteristics of the WSR channel.” Neither the Wang patent nor the Kamioka patent describe testing the timing characteristics of the channel or generating any set of calibration signals responsive to the timing characteristics

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determined by testing. Consequently claim 8 and its dependent claims 9-12 distinguish over the art of record and are in condition for allowance.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (310) 785-4600 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,

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